ORDER NO. KM49904405C1
F1

Service Manual

Integrated Telephone System

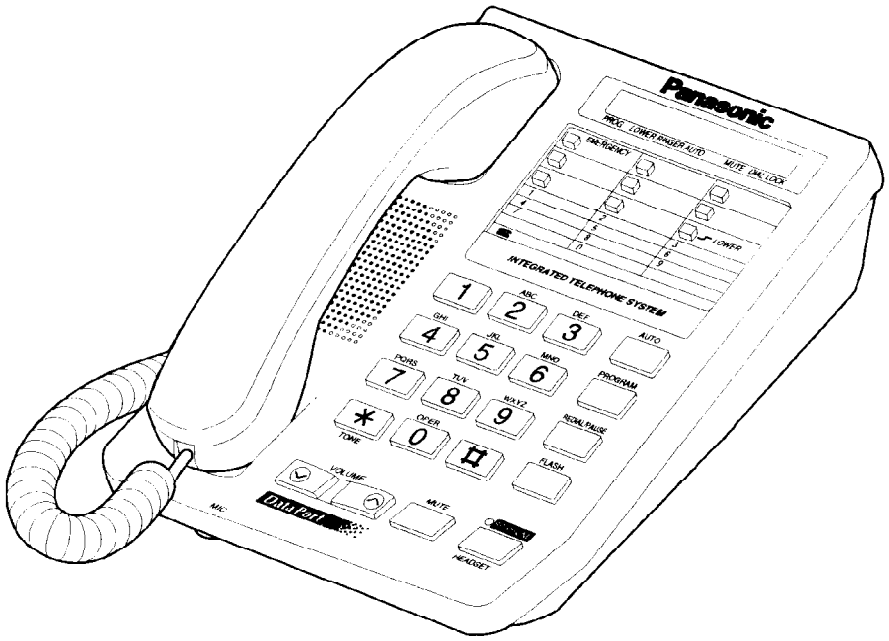
Data Port

Telephone Equipment

KX-TS17-W

White Version

(for U.S.A)



■ SPECIFICATIONS

Power Source:	Telephone line voltage
Memory Capacity:	26 telephone numbers, up to 21 digits for each station
Dial Speed:	Tone (DTMF) /Pulse (10 pps)
Redial:	Last dialed telephone number
Pause:	3.5 sec
Speaker:	Handset; 3 cm ($1^{3}/_{16}$") PM dynamic type receiver unit, 150 Ω
Microphone:	Electret condenser microphone
Dimensions:	$8^{3}/_{4}$"×$6^{23}/_{32}$"×$3^{1}/_{2}$" (222×171×89 mm)
Weight:	1.43 lbs. (650g)

Design and specifications are subject to change without notice.

Panasonic

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Display

(This display shows all of the possible configurations.)

15-30	During a conversation, the call duration is displayed. (Example: 15 minutes, 30 seconds)
→	The unit is in the programming mode.
→•	The AUTO button was pressed while dialing or storing phone numbers for the Speed Dialer.
⌐	The LOWER button was pressed.
⊠	The ringer is set to OFF.
⊠	The MUTE button was pressed during a conversation.
⌐O	The dial lock mode is set.
F	The FLASH button was pressed while storing phone numbers.
P	The PAUSE button was pressed while dialing or storing phone numbers.
4	You pressed ✱ while dialing or storing phone numbers in the TONE mode.
=	You pressed # while dialing or storing phone numbers in the TONE mode.
0	While storing a phone number in an UPPER memory location for the One-Touch Dialer, "0" will appear when you press a one-touch auto dial button.
o	While storing a phone number in a LOWER memory location for the One-Touch Dialer, "o" will appear when you press a one-touch auto dial button.
[-]	The MUTE button was pressed as a secret button while storing phone numbers.
_	While programming function items, such as the dialing mode, "_" will flash as a cursor.

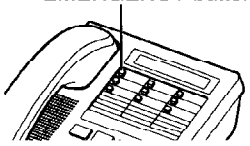
NEW OPERATION

Dial Lock

You can prohibit anyone from making a call to any number except the one you programmed in the UPPER memory location at the top left one-touch auto dial button (EMERGENCY button). Once you locked the dialing buttons, even emergency numbers, such as 911, cannot be dialed. Only incoming calls are accepted until the dial lock is canceled.

Before using this feature, we recommend storing an emergency number in the UPPER memory location in the top left one-touch auto dial button (EMERGENCY button). Even if the dialing buttons are locked, the number stored in this button can be dialed.

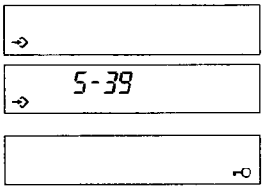
EMERGENCY button



Note: If you choose not to program an emergency number, but plan to use dial lock, any number programmed into the UPPER memory location in the top left one-touch auto dial button can be accessed.

To set the dial lock

1. Program the emergency number you want to have accessible. (See above.) Mark the button accordingly.
2. Lift the handset.
3. Press **PROGRAM**.
4. Press **5**, **3** and then **9**.
5. Press **PROGRAM**.
   - "⊸O" is displayed.
6. When finished, replace the handset.



In the stand-by mode, the display is blank.
"⊸O" will be displayed when you lift the handset or press **SP-PHONE/HEADSET**.

To cancel the dial lock
Repeat steps 2 through 6.
- "⊸O" will disappear.

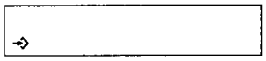
NOMAL OPERATIONS

Selecting the Dialing Mode

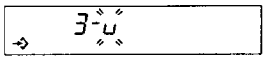
You can select the dialing mode by programming. If you have touch tone service, set to TONE. If rotary or pulse service is used, set to PULSE. Your phone comes from the factory set to TONE.

1 Lift the handset.

2 Press **PROGRAM**.
- "➔" is displayed.

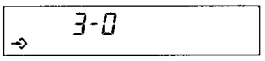


3 Press **3**.



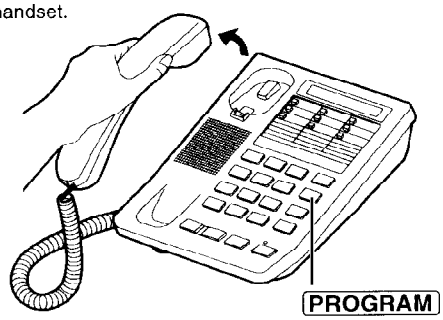
4 To select PULSE, press **0**.
OR
To select TONE, press **1**.

Ex. PULSE is selected.



5 Press **PROGRAM**.
- A beep sounds on the handset.

6 When finished, replace the handset.



- To cancel during programming, replace the handset, then start from step 1.
- If 4 beeps sound during programming, a wrong key was pressed. Replace the handset, then start from step 1.

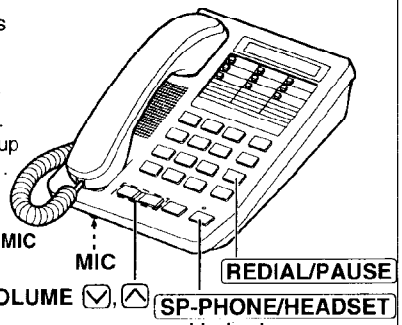
Making Calls

You can make a call by simply lifting the handset. To hang up, place the handset on the cradle.

Using the speakerphone

1 Press **SP-PHONE/HEADSET**.
- The indicator lights.

2 Dial a phone number.
- The dialed number is displayed.
- After a few seconds, the display will show the length of the call.
- If you misdial, hang up and start from step 1.



3 When the other party answers, talk into the **MIC** (microphone).

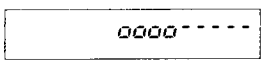
4 To hang up, press **SP-PHONE/HEADSET**.
- The indicator light goes out.
- The display will return to the stand-by mode.

To adjust the handset volume (5 levels) or the speaker volume (9 levels) while talking

To increase, press **VOLUME** △.
To decrease, press **VOLUME** ▽.
- "□" shows the volume level.
- After a few seconds, the display will return to the length of the call.
- After hanging up, the handset volume will return to the middle level.

Ex. Handset volume level: 4

Ex. Speaker volume level: 4



To redial the last number dialed

Lift the handset or press **SP-PHONE/HEADSET** ➡ press **REDIAL/PAUSE**.

Answering Calls

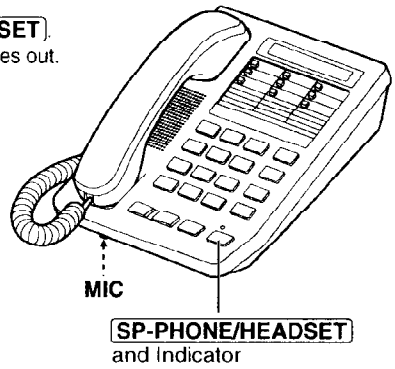
While a call is being received, the unit rings. You can answer it by simply lifting the handset.

Using the speakerphone

1 Press [SP-PHONE/HEADSET].
- The indicator lights.

2 Talk into the **MIC** (microphone).

3 To hang up, press [SP-PHONE/HEADSET].
- The indicator light goes out.



- When the ringer volume is set to OFF, the unit will not ring.

During the speakerphone operation:
- For best speakerphone performance, talk alternately with the caller in a quiet room.
- If the caller complains that your voice is hard to hear, press **VOLUME** ▽ to decrease the speaker volume.
- You can switch to the handset by lifting it up. To switch back to the speakerphone, press [SP-PHONE/HEADSET].

When the optional headset is connected to the unit, be sure to use the headset to talk with the caller. If you want to have a normal phone conversation, disconnect the headset.

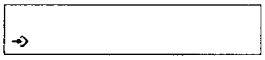
Speed Dialer

Storing Phone Numbers in Memory

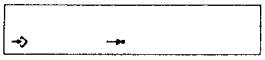
You can store up to 10 phone numbers in the memory stations. The dialing buttons ([0] to [9]) function as memory station numbers. Do not press any memory stations before storing to prevent misoperation.

1 Lift the handset.

2 Press [PROGRAM].
- "→" is displayed.

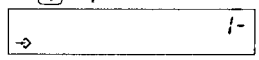


3 Press [AUTO].
- "→" is displayed.

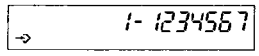


4 Press a memory station number ([0] to [9]).

Ex. [1] is pressed.

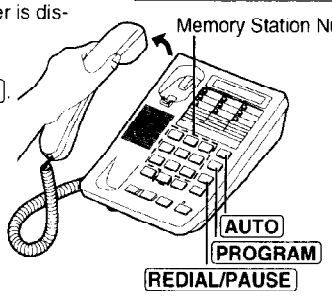


5 Enter a phone number up to 21 digits.
- The entered number is displayed.



6 Press [PROGRAM].
- A beep sounds on the handset.

7 When finished, replace the handset.
- To store other numbers, repeat steps 1 through 7.

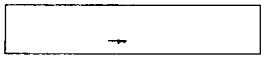


- If a pause is required for dialing, [REDIAL/PAUSE] can be stored in a phone number counting as one digit.
- To cancel during programming, replace the handset, then start from step 1.
- If 4 beeps sound during programming, a wrong key was pressed. Replace the handset, then start from step 1.
- You can keep the stored numbers confidential.

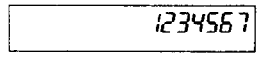
Dialing a Stored Number

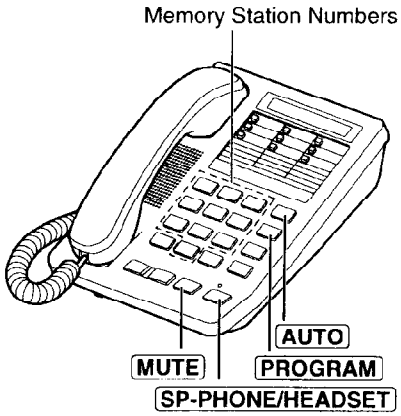
1 Lift the handset or press [SP-PHONE/HEADSET].

2 Press [AUTO].



3 Press the memory station number ([0] to [9]).
- The stored number is displayed and dialed.





One-Touch Dialer

You can store up to 16 phone numbers in the one-touch auto dial buttons (8 numbers in UPPER memory locations, 8 numbers in LOWER memory locations).

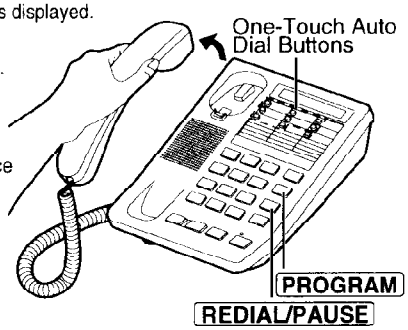
Storing Phone Numbers in Memory

Do not press any one-touch auto dial buttons before storing to prevent misoperation.

To store in an UPPER memory location

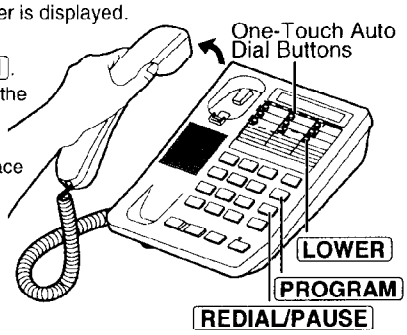
It is recommended that you program an emergency number in the top left one-touch auto dial button (EMERGENCY button).

1. Lift the handset.
2. Press **PROGRAM**.
   - "→" is displayed.
3. Press one of the one-touch auto dial buttons.
   - "0-" is displayed.
4. Enter a phone number up to 21 digits.
   - The entered number is displayed.
5. Press **PROGRAM**.
   - A beep sounds on the handset.
6. When finished, replace the handset.
   - To store other numbers, repeat steps 1 through 6.



To store in a LOWER memory location

1. Lift the handset.
2. Press **PROGRAM**.
   - "→" is displayed.
3. Press **LOWER** to select a lower memory location.
   - "⌐" is displayed.
4. Press one of the one-touch auto dial buttons.
   - "0-" is displayed.
5. Enter a phone number up to 21 digits.
   - The entered number is displayed.
6. Press **PROGRAM**.
   - A beep sounds on the handset.
7. When finished, replace the handset.
   - To store other numbers, repeat steps 1 through 7.



- If a pause is required for dialing, **REDIAL/PAUSE** can be stored in a phone number counting as one digit.
- To cancel during programming, replace the handset, then start from step 1.
- If 4 beeps sound during programming, a wrong key was pressed. Replace the handset, then start from step 1.
- You can keep the stored numbers confidential.

Dialing a Stored Number

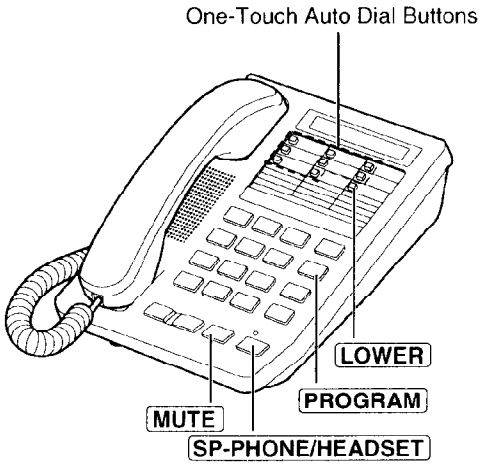
With an UPPER memory location:

1. Lift the handset or press **SP-PHONE/HEADSET**.
2. Press the desired one-touch auto dial button.
   - The stored number is displayed and dialed.

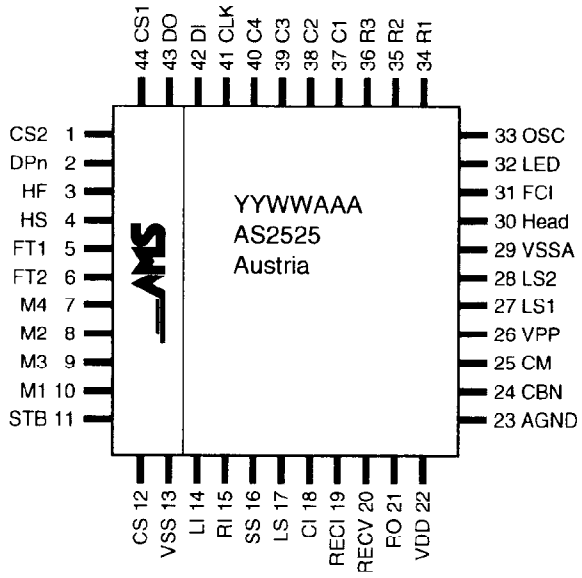
OR

With a LOWER memory location:

1. Lift the handset or press **SP-PHONE/HEADSET**.
2. Press **LOWER**.
3. Press the desired one-touch auto dial button.
   - The stored number is displayed and dialed.



CPU DATA

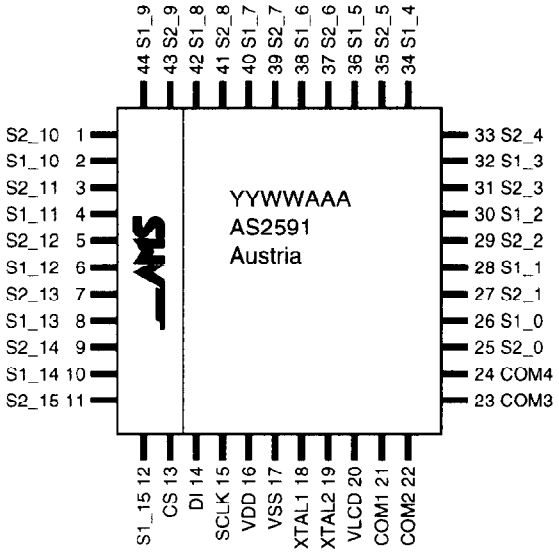


IC1
Speech circuit, dialer and tone ringer
Memory: 21 digit 26 station
Clock frequency: 3.58MHz
Operating range: 15~100mA

Pin No.	Symbol	Function
1	CS2	ChipSelect 2 Chip select signal for external LCD driver circuit or 2mA LED. If signal is not activated a pull down resistor (100kOhm) is inserted.
2	DPn	Dial Pulse Output Digital output which holds the line during off-hook operation or pulls low during break periods of pulse dialing and flash.
3	HF	HandsFree Switch Input This is an Schmitt-trigger input that is pulled high indicating handsfree operation.
4	HS	HandSet Switch Input This is an Schmitt-trigger input that is pulled high by the hook switch indicating handset or headset operation.
5	FT1	Analog input pin for connecting a capacitor for offset cancellation.
6	FT2	Analog input pin for connecting a capacitor for offset cancellation.
7	M4	Microphone Input 4 Differential input for the handsfree microphone (electret).
8	M2	Microphone Input 2 Differential input for the handset microphone (electret).
9	M3	Microphone Input 3 Differential input for the handsfree microphone (electret).
10	M1	Microphone Input 1 Differential input for the handset microphone (electret).
11	STB	Side Tone Balance Input Analog input for side tone cancellation network.
12	CS	Current Shunt Control Output N-channel open drain output to control the external high power shunt transistor for synthesising AC- and DC-impedance, modulation of line voltage and shorting the line during make periods of pulse dialing.
13	VSS	Voltage Source Source Negative Power Supply
14	LI	Line Input Analog input used for power extraction and line current sensing.
15	RI	Receive Input Analog input for ac-separated receive signal.

Pin No.	Symbol	Function
16	SS	Supply Source Control Output N-channel open drain output to control the external high power source transistor for supplying (Vpp) the loudspeaker amplifier in off-hook loudspeaking/handsfree mode.
17	LS	Line Current Sense Input Analog input for sensing the line current.
18	CI	Complex Impedance Input Analog input pin for the capacitor to program a complex impedance.
19	RECI	Analog input for the handsfree receive path. Schould be connected to RO via coupling capacitor.
20	RECV	Analog input for receive voice switching path.
21	RO	Receive Output to Handset Output for driving a dynamic earpiece with an impedance from 150Ω to 300Ω.
22	VDD	Voltage Drain Drain Positive Power Supply
23	AGND	Analog Ground Special ground for the internal amplifiers.
24	CBN	Analog Input pin for connecting a capacitor for background noise monitoring.
25	CM	Converter Make Output This is an output for controling the external switching converter. During ringing it converts the ring signal into a 4V supply voltage.
26	VPP	Loudspeaker Power Supply High power supply for the output driver stage.
27 28	LS1 LS2	Loudspeaker Output 1 Output pins for a 32Ω (25 to 50Ω) loudspeaker
29	VSSA	Power supply pin for LS1-LS2 output amplifier.
30	HEAD	HEADset Switch Input Digital input for choosing handset and headset mode or choosing between LD and MF dialing. See section "Service Code Programming 4" for further details. This pin is scanned only after manual OFF-HOOK.
31	FCI	Frequency Comparator Input This is a Schmitt-trigger input for ring frequency discrimination. Disabled during off-hook.
32	LED	LED Output Digital output for connecting 2mA LED.
33	OSC	Oscillator Input Input for ceramic resonator 3.58MHz.
34 35 36	R1 R2 R3	Keyboard Rows (see key arrangement)
37 38 39 40	C1 C2 C3 C4	Keyboard Columns (see key arrangement)
41	CLK	Clock Clock output of 3 wire bus. If signal is not activated a pull down resistor (100kOhm) is inserted.
42	DI	DataInput Data input of 3 wire bus. If signal is not activated a pull down resistor (100kOhm) is inserted.
43	DO	DataOutput Data output of 3 wire bus. A 100k resistor connected from this pin to vss enables key-locking. If signal is not activated a pull down resistor (100kOhm) is inserted.
44	CS1	ChipSelect 1 Chip select signal for external EEPROM. If signal is not activated a pull down resistor (100kOhm) is inserted.

CPU DATA



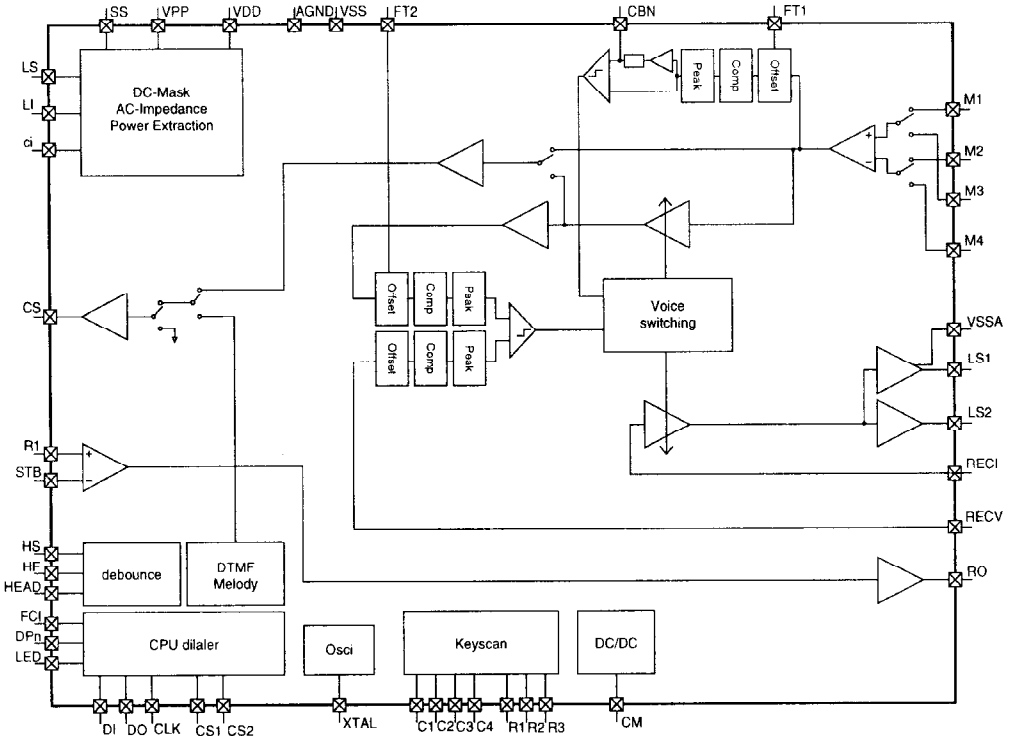
IC103
Driving LCD-displays with 16 segments
Operating Voltage: 3.2V~4.8V
LCD Input Voltage: 3.0V
Quartz crystal clock frequency : 32.768KHz

Key features

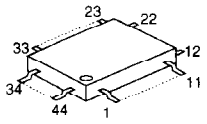
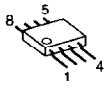
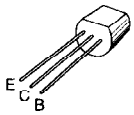
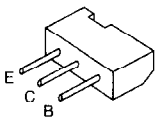
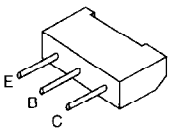
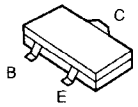
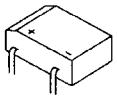
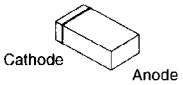
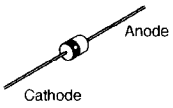
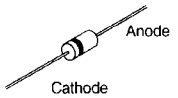
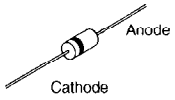
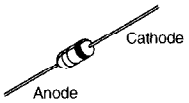
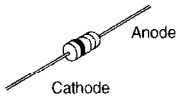
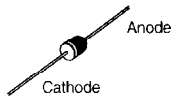
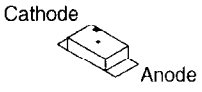
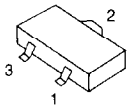
AS2591 is a CMOS mixed-mode integrated circuit for driving LCD-displays with 4 backplanes and 12 or 16 segments. It is controled via a simple 2 wire bus and a chip select signal. The device also includes a "talk timer" which starts 5 seconds after the last digit entry. The timer also shows the elapsed time up to 5 seconds after the ON-HOOK transition.

Pin No.	Symbol	Function
1, 3, 5, 7, 9, 11, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43	S2_n	Segment input 2 of n-th Segment
13	CS	Chip Select Chip select input. 1...Chip enabled, 0...Chip disabled
14	DI	DataInput Data input of 2 wire bus
15	SCLK	Serial Clock Clock input of 2 wire bus
16	VDD	Voltage Drain Drain Positive Power Supply
17	VSS	Voltage Source Source Negative Power Supply
18 19	XTAL1 XTAL2	Inputs for connecting a 32.768 kHz quartz crystal.
20	VLCD	Voltage for LCD Input voltage for LCD-display.
21 22 23 24	COM1 COM2 COM3 COM4	Backplane outputs.
2, 4, 6, 8, 10, 12, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44	S1_n	Segment input 1 of n-th Segment

IC BLOCK DIAGRAM



TERMINAL GUIDE OF IC'S TRANSISTORS ANS DIODES

 PQVIAS2525	 PQVI93LC66AT	 PQVTKSB564AC PQVT2N6517CA	 2SB1209 2SD1819A	 2S1625
 UN5113 2SB1218A	 PQVDS1YB40F1	 MA110 MA8030	 1SS119 1S2076	 1SS119 1S2076
 MA700A	 1SS244, MA4043 MA4051	 MA4200, MA4082	 PQVDS5688G	 PQVDSML210LT
 MA143				

SERVICE CODE PROGRAMMING

item	(remark)	procedure
interdigit pause	(840ms)	PROG→0→0123→*1→E17→PROG
tone duration	(82ms)	PROG→0→0123→*2→FD0→PROG
inter tone pause	(82ms)	PROG→0→0123→*3→FD2→PROG
flash time 1	(700ms)	PROG→0→0123→*4→FC8→PROG
flash time 2	(100ms)	PROG→0→0123→*5→E64→PROG
pause time 1	(3500ms)	PROG→0→0123→*6→809→PROG
pause time 2	(3500ms)	PROG→0→0123→*7→809→PROG
Handset TX gain	(37dB)	PROG→0→0123→01→7→PROG
Handset RX gain	(1dB)	PROG→0→0123→02→7→PROG
Handsfree TX gain	(49dB)	PROG→0→0123→03→A→PROG
handsfree RX gain	(37dB)	PROG→0→0123→04→F→PROG
LLC	(off)	PROG→0→0123→05→0→PROG
DTMF Level	(-6dBm)	PROG→0→0123→06→C→PROG
Headset TX gain	(44dB)	PROG→0→0123→07→E→PROG
Headset RX gain	(1dB)	PROG→0→0123→08→7→PROG
Handset DTMF comf.	(-30dBr)	PROG→0→0123→09→1→PROG
Handsfree DTMF comf.	(-9dBr)	PROG→0→0123→00→1→PROG
Make/Break time	(40/60ms)	PROG→0→0123→#1→1→PROG
Pulse per socond	(10pps)	PROG→0→0123→#2→0→PROG
LI Voltage	(4.5V)	PROG→0→0123→#3→1→PROG
Handset TX softclip	(on)	PROG→0→0123→#4→1→PROG
Handset RX softclip	(off)	PROG→0→0123→#5→0→PROG
Background Noise Monitor	(off)	PROG→0→0123→#6→0→PROG
Melody 2/3 tone	(3 tone)	PROG→0→0123→#8→1→PROG
Key Beep	(on)	PROG→0→0123→#9→1→PROG
PIN code reset		PROG→0→0123→#0→1→PROG
Flash 1 during LD	(on)	PROG→0→0123→#*→1→PROG
Flash 2 during LD	(on)	PROG→0→0123→##→1→PROG
Extended symbols	(off)	PROG→0→0123→91→0→PROG
Handsfree TX softclip	(on)	PROG→0→0123→92→1→PROG
Handsfree RX softclip	(off)	PROG→0→0123→93→0→PROG
Voice switch speed	(speed 4)	PROG→0→0123→94→2→PROG
Hook resets RX volume	(on)	PROG→0→0123→95→1→PROG
*is temp MF and *	(off)	PROG→0→0123→97→0→PROG
Key lock enable	(on)	PROG→0→0123→98→1→PROG
Head pin	(Headset)	PROG→0→0123→99→0→PROG
Ring OFF selectable	(on)	PROG→0→0123→90→1→PROG
Handset VOL control	(on)	PROG→0→0123→9#→1→PROG

ex.) Input the interdigit pause (840ms).

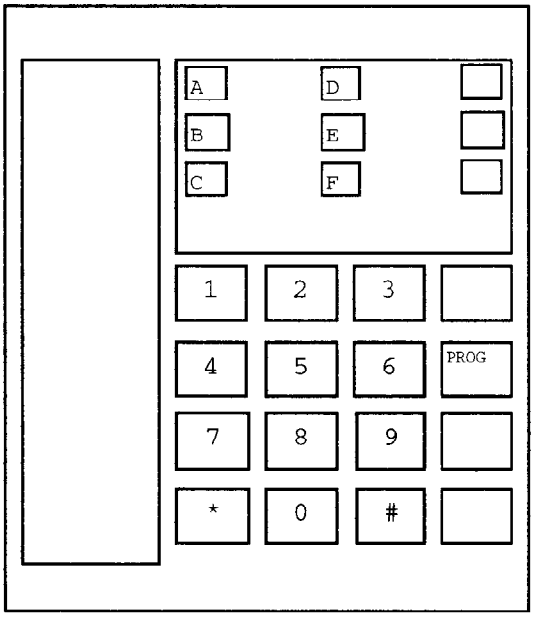
[PROGRAM] → [0] → [0] → [1] → [2] → [3] → [*] → [1] → [E] → [1] → [7] → [PROGRAM]

Calculating Data word.

$$DATA = 4096 - \left(\frac{3580000}{512 \times 12} \times T\right)$$

T: Duration (sec)
DATA: 12bit result

The key arrangement for above program is as shown in the drawing. →



FOR SCHEMATIC DIAGRAM (page 19)

Notes:

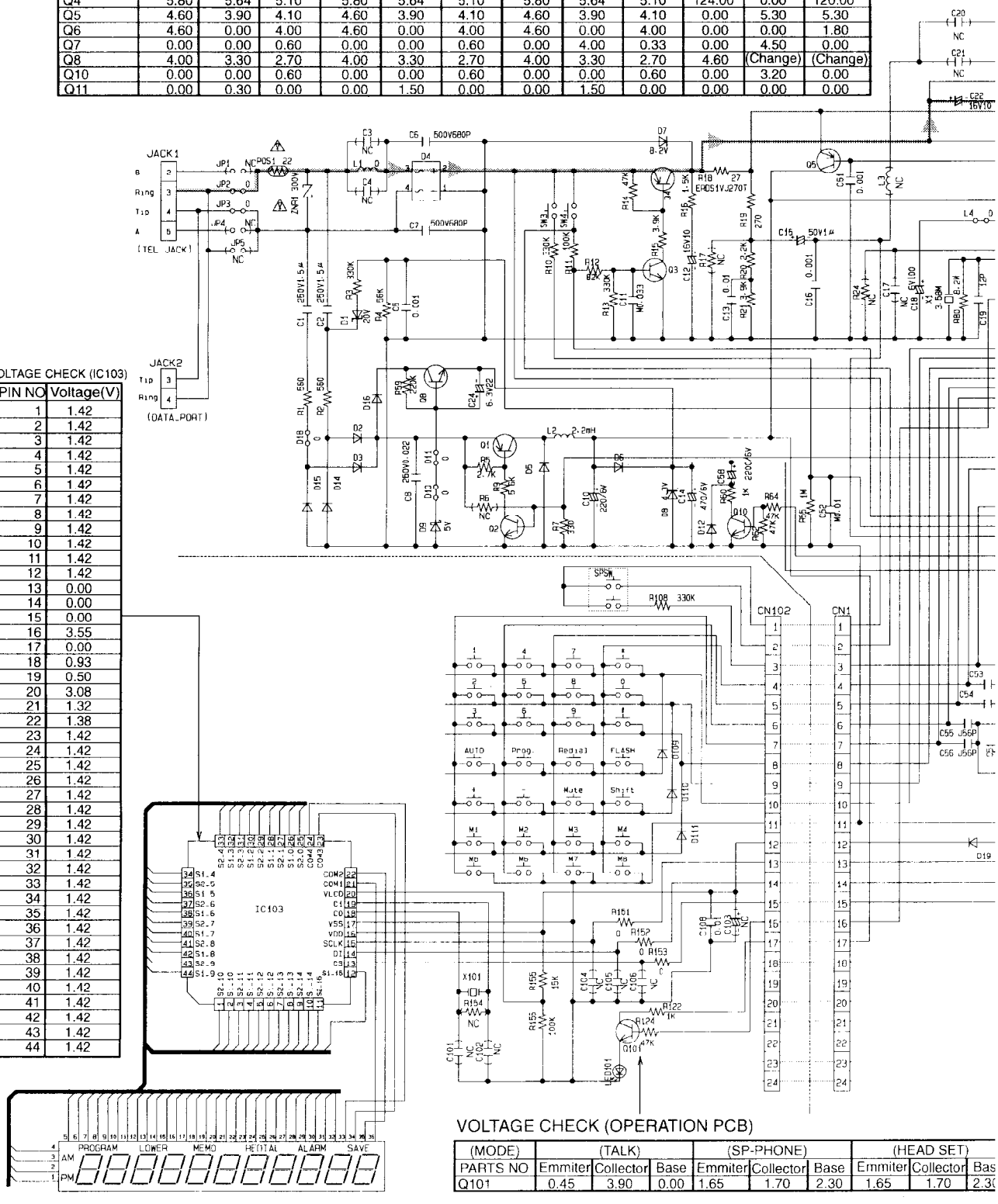
1. S1: Hook switch in "OFF-HOOK" position.
2. S2: Dialing mode selector switch in "TONE" position.
3. S3: Ringer volume selector switch in "HIGH" position.
4. DC voltage measurements are taken with electronic voltmeter from negative terminal of battery. (Add 40 mA to telephone line from the loop simulator.)
5. This schematic diagram may be modified at any time with the development of new technology.
6. **Important Safety Notice:**
   The shaded area on this schematic diagram incorporates special features important for protection from fire and electrical shock hazards.
   When servicing it is essential that only manufacturer's specified parts be used for the critical components in the shaded areas of the schematic.

VOLTAGE CHECK (MAIN PCB)

(MODE)	(TALK)			(SP-PHONE)			(HEAD SET)			(BELL)		
PARTS NO	Emmiter	Collector	Base	Emmiter	Collector	Base	Emmiter	Collector	Base	Emmiter	Collector	Base
Q1	3.6(V)	3.90	3.60	3.6(V)	3.90	3.60	3.6(V)	3.90	3.60	(Change)	5.50	
Q2	0.00	3.60	0.00	0.00	3.60	0.00	0.00	3.60	0.00	0.00	(Change)	0.00
Q3	0.00	0.14	0.63	0.00	0.14	0.63	0.00	0.14	0.63	0.00	118.00	0.00
Q4	5.80	5.64	5.10	5.80	5.64	5.10	5.80	5.64	5.10	124.00	0.00	120.00
Q5	4.60	3.90	4.10	4.60	3.90	4.10	4.60	3.90	4.10	0.00	5.30	5.30
Q6	4.60	0.00	4.00	4.60	0.00	4.00	4.60	0.00	4.00	0.00	0.00	1.80
Q7	0.00	0.00	0.60	0.00	0.00	0.60	0.00	4.00	0.33	0.00	4.50	0.00
Q8	4.00	3.30	2.70	4.00	3.30	2.70	4.00	3.30	2.70	4.60	(Change)	(Change)
Q10	0.00	0.00	0.60	0.00	0.00	0.60	0.00	0.00	0.60	0.00	3.20	0.00
Q11	0.00	0.30	0.00	0.00	1.50	0.00	0.00	1.50	0.00	0.00	0.00	0.00

VOLTAGE CHECK (IC103)

PIN NO	Voltage(V)
1	1.42
2	1.42
3	1.42
4	1.42
5	1.42
6	1.42
7	1.42
8	1.42
9	1.42
10	1.42
11	1.42
12	1.42
13	0.00
14	0.00
15	0.00
16	3.55
17	0.00
18	0.93
19	0.50
20	3.08
21	1.32
22	1.38
23	1.42
24	1.42
25	1.42
26	1.42
27	1.42
28	1.42
29	1.42
30	1.42
31	1.42
32	1.42
33	1.42
34	1.42
35	1.42
36	1.42
37	1.42
38	1.42
39	1.42
40	1.42
41	1.42
42	1.42
43	1.42
44	1.42



VOLTAGE CHECK (OPERATION PCB)

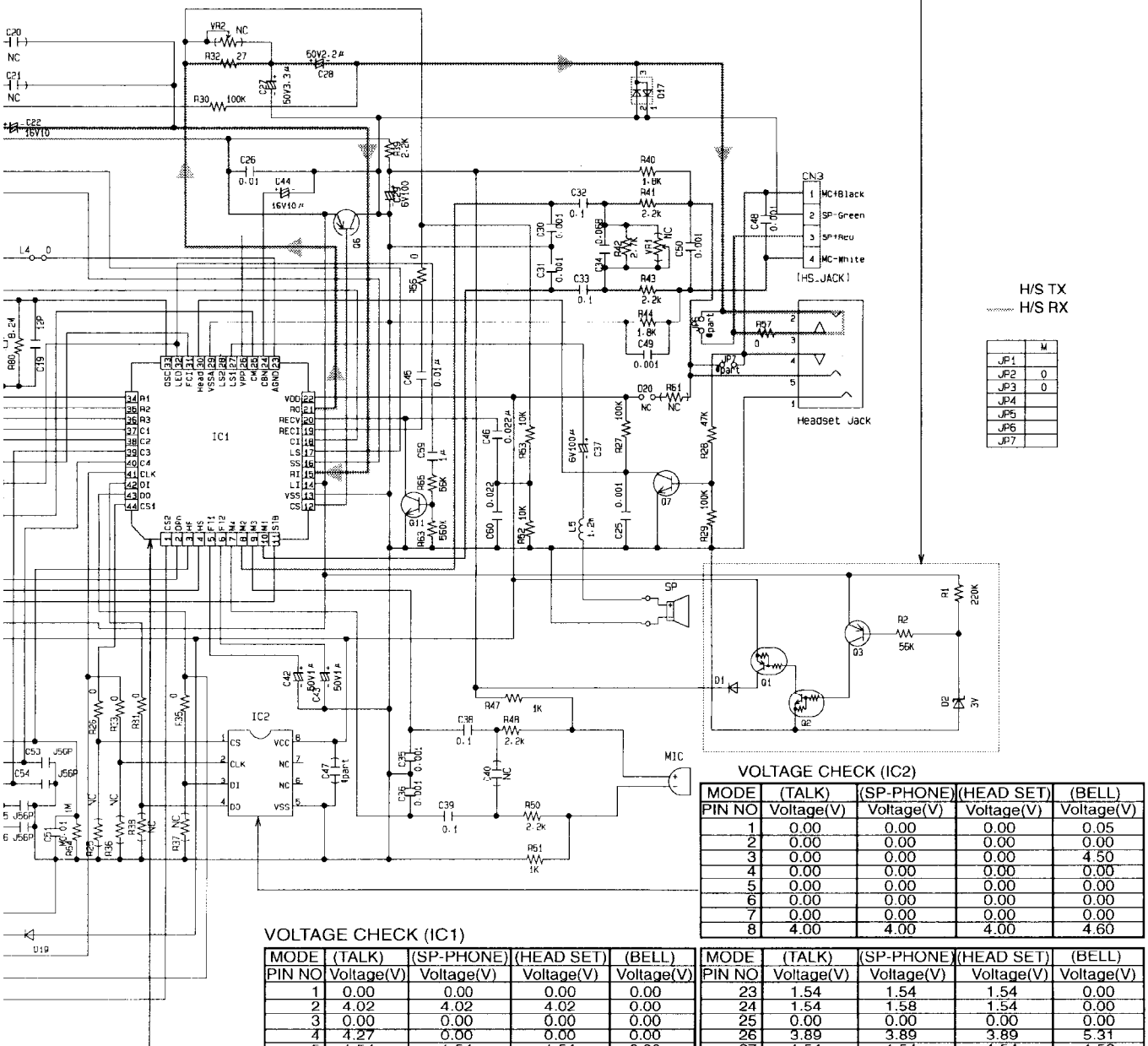
(MODE)	(TALK)			(SP-PHONE)			(HEAD SET)		
PARTS NO	Emmiter	Collector	Base	Emmiter	Collector	Base	Emmiter	Collector	Bas
Q101	0.45	3.90	0.00	1.65	1.70	2.30	1.65	1.70	2.3

ATIC DIAGRAM

7 | 8 | 9 | 10 | 11 | 12

VOLTAGE CHECK (SUB PCB)

(MODE)	(TALK)			(SP-PHONE)			(HEAD SET)			(BELL)		
PARTS NO	Emmiter	Collector	Base	Emmiter	Collector	Base	Emmiter	Collector	Base	Emmiter	Collector	Base
Q1	4.00	4.00	0.00	4.00	4.00	0.00	4.00	4.00	0.00	4.60	0.00	4.50
Q2	0.00	0.00	4.60	0.00	0.00	4.60	0.00	0.00	4.60	4.50	0.00	0.00
Q3	4.60	4.60	4.00	4.60	4.60	4.00	4.60	4.60	4.00	0.00	0.00	0.00



VOLTAGE CHECK (IC2)

MODE	(TALK)	(SP-PHONE)	(HEAD SET)	(BELL)
PIN NO	Voltage(V)	Voltage(V)	Voltage(V)	Voltage(V)
1	0.00	0.00	0.00	0.05
2	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	4.50
4	0.00	0.00	0.00	0.00
5	0.00	0.00	0.00	0.00
6	0.00	0.00	0.00	0.00
7	0.00	0.00	0.00	0.00
8	4.00	4.00	4.00	4.60

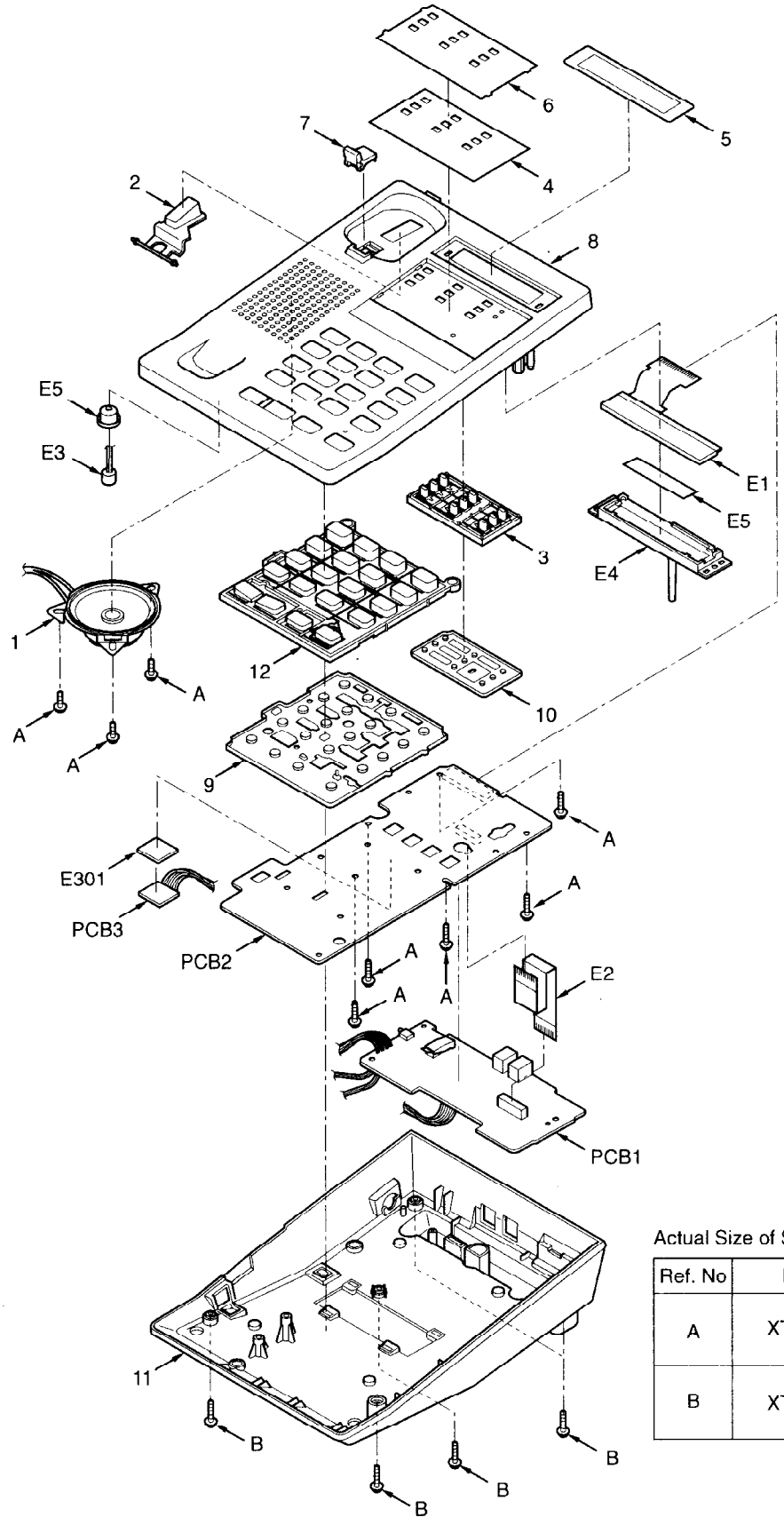
VOLTAGE CHECK (IC1)

MODE	(TALK)	(SP-PHONE)	(HEAD SET)	(BELL)
PIN NO	Voltage(V)	Voltage(V)	Voltage(V)	Voltage(V)
1	0.00	0.00	0.00	0.00
2	4.02	4.02	4.02	0.00
3	0.00	0.00	0.00	0.00
4	4.27	0.00	0.00	0.00
5	1.54	1.54	1.54	0.00
6	1.54	1.54	1.54	0.00
7	0.35	1.54	0.35	0.00
8	1.54	0.37	1.54	0.00
9	0.33	1.50	0.33	0.00
10	1.51	0.37	1.51	0.00
11	1.53	1.53	1.53	0.00
12	3.98	3.98	3.98	0.00
13	0.00	0.00	0.00	0.00
14	4.62	4.62	4.62	0.00
15	1.54	1.54	1.54	0.24
16	4.14	3.99	4.14	5.27
17	5.63	5.63	5.63	0.00
18	1.54	1.54	1.54	0.00
19	1.45	1.45	1.45	1.48
20	0.12	0.12	0.12	0.00
21	1.47	1.47	1.47	0.00
22	4.03	4.03	4.03	4.57

MODE	(TALK)	(SP-PHONE)	(HEAD SET)	(BELL)
PIN NO	Voltage(V)	Voltage(V)	Voltage(V)	Voltage(V)
23	1.54	1.54	1.54	0.00
24	1.54	1.58	1.54	0.00
25	0.00	0.00	0.00	0.00
26	3.89	3.89	3.89	5.31
27	1.54	1.54	1.54	1.52
28	1.52	1.52	1.52	1.47
29	0.00	0.00	0.00	0.00
30	0.00	0.00	4.00	4.51
31	0.00	0.00	0.00	(CHANGE)
32	0.00	4.01	4.01	0.00
33	0.00	0.00	0.00	0.00
34	0.00	0.00	0.00	0.00
35	0.00	0.00	0.00	0.00
36	0.00	0.00	0.00	0.00
37	4.00	4.00	4.00	0.00
38	4.00	4.00	4.00	0.00
39	4.00	4.00	4.00	0.00
40	4.00	4.00	4.00	0.00
41	0.00	0.00	0.00	0.00
42	0.00	0.00	0.00	0.00
43	0.00	0.00	0.00	4.53
44	0.00	0.00	0.00	0.00

ET)		(BELL)		
tor	Base	Emmiter	Collector	Base
	2.30	0.00	5.30	0.00

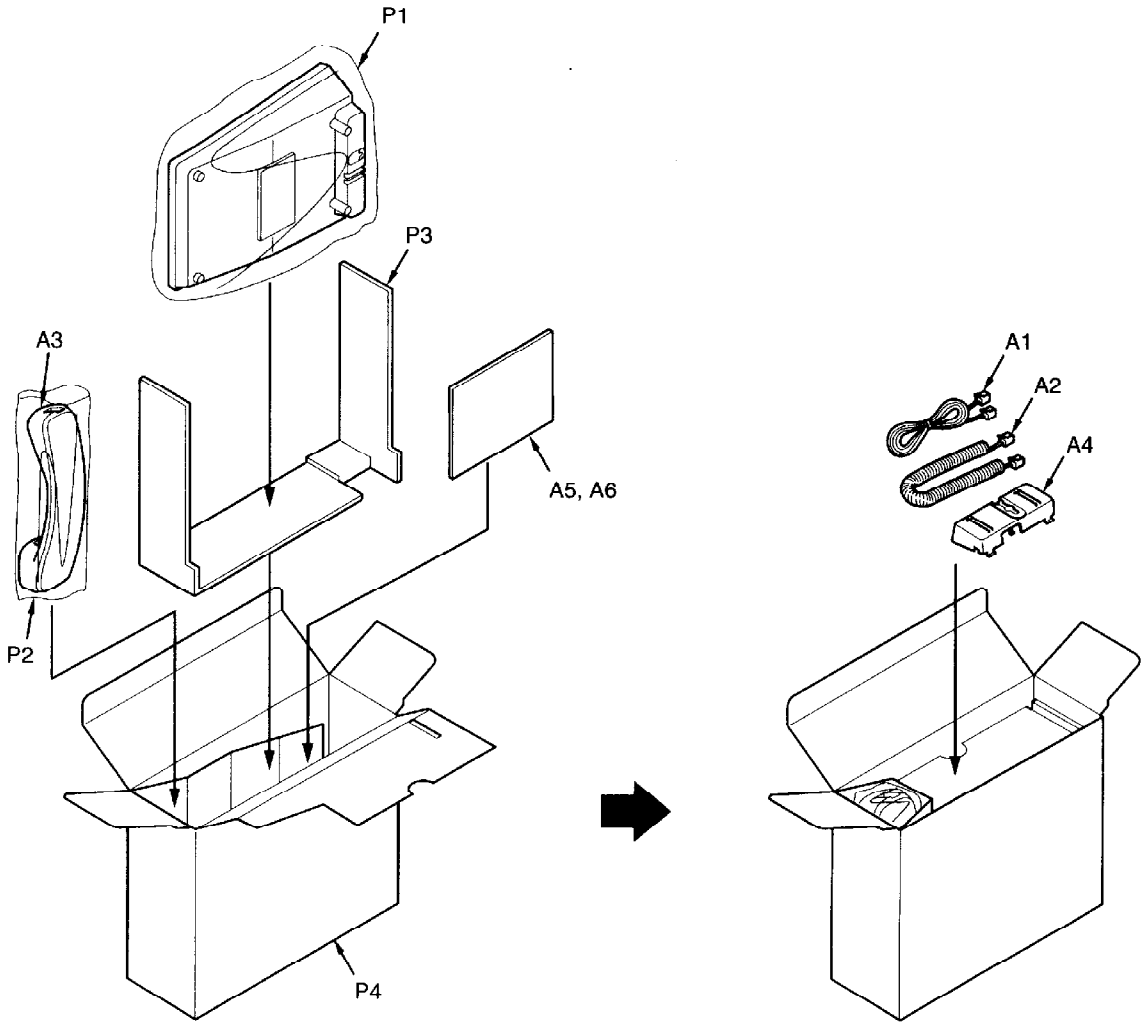
CABINET AND ELECTRICAL PARTS LOCATION



Actual Size of Screws

Ref. No	Part No.	Screw
A	XTW3+S10P	
B	XTW3+S14P	

ACCESSORES AND PACKING MATERIALS



This replacement parts list is U. S. A. version only. Refer to the simplified manual (cover) for Canada or other areas.

REPLACEMENT PARTS LIST

Model KX-TS17-W

Notes:

1. RTL (Retention Time Limited)
   The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing part and product retention. After the end of this period, the assembly will no longer be available.
2. Important safety notice.
   Components identified by the ⚠ mark special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. The S mark indicates service standard parts and may differ from production parts.
4. RESISTORS & CAPACITORS
   Unless otherwise specified.
   All resistors are in ohms (Ω) K=1000Ω, M=1000KΩ
   All capacitors are in MICRO FARADS (μF) P= μμF
   *Type &Wattage of Resistor
   Type

ERC:Solid	ERX:Metal Film	PQ4R:Carbon
ERD:Carbon	ERG:Metal Oxide	ERS:Fusible Resistor
PQRD:Carbon	ER0:Metal Film	ERF:Cement Resistor

Wattage

10,16:1/8W	14,25:1/4W	12:1/2W	1:1W	2:2W	3:3W

*Type & Voltage of Capacitor
Type

ECFD:Semi-Conductor	ECCD,ECKD,ECBT,PQCBC : Ceramic
ECQS:Styrol	ECQE,ECQV,ECQG : Polyester
PQCUV:Chip	ECEA,ECSZ : Electrolytic
ECQMS:Mica	ECQP : Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H: 50V	05: 50V	0F:3.15V	0J :6.3V	1V :35V
2A:100V	1:100V	1A:10V	1A :10V	50,1H:50V
2E:250V	2:200V	1V:35V	1C :16V	1J :63V
2H:500V		0J:6.3V	1E,25:25V	2A :100V

Ref. No.	Part No.	Part Name & Description	Pcs/Set
		CABINET AND ELECTRICAL PARTS	
1	PQAS65P37Z	SPEAKER	1
2	PQBH10027Z1	BUTTON, HOOK	1
3	PQBX10322Z1	BUTTON, 9 KEY	1
4	PQGD10156Y	TEL CARD	1
5	PQGP10143Z1	LCD PANEL	1
6	PQGV10034Z	TEL CARD COVER	1
7	PQKE10070Z3	HANGER	1
8	PQKM10357X1	UPPER CABINET	1
9	PQSX10088Y	RUBBER SWITCH, 20 KEY	1
10	PQSX10089Z	RUBBER SWITCH, 9 KEY	1
11	PQYF10138X1	LOWER CABINET	1
12	PQYT10012Z1	BUTTON, 19 KEY ASS'Y	1

Ref. No.	Part No.	Part Name & Description	Pcs/Set
		ACCESSORIES	
A1	PQJA10075Z	TELEPHONE CORD	1
A2	PQJA212M	CURL CORD	1
A3	PQJXF0102Z	HANDSET	1
A4	PQKL24Y81	STAND S	1
A5	PQQW12079Z	QUICK REFERENCE GUIDE (for Spanish)	1
A6	PQQX12159Z	INSTRUCTION BOOK	1
		PACKING MATERIALS	
P1	PQPH89Y	PROTECTION COVER (for Unit)	1
P2	XZB10X35A02	PROTECTION COVER (for Handset)	1
P3	PQPD10415Z	CUSHION	1
P4	PQPK12746Y	GIFT BOX	1
		MAIN PRINTED CIRCUIT BOARD PARTS	
PCB1	PQWP1TS17W	MAIN, P. C. BOARD ASS'Y (NLA)	1
		(ICS)	
IC1	PQVIAS2525	IC	1
IC2	PQVI93LC66AT	IC	1
		(TRANSISTORS)	
Q 1	2SB1209	TRANSISTOR(SI)	1
Q 2	PQVT2N6517CA	TRANSISTOR(SI)	1
Q 3	PQVT2N6517CA	TRANSISTOR(SI)	1
Q 4	2SA1625	TRANSISTOR(SI) (or 2SA1776P)	1
Q 5	PQVTKSB564AC	TRANSISTOR(SI)	1
Q 6	PQVTKSB564AC	TRANSISTOR(SI)	1
Q 7	2SD1819A	TRANSISTOR(SI)	1
Q 8	PQVT2N6517CA	TRANSISTOR(SI)	1
Q10	2SD1819A	TRANSISTOR(SI)	1
Q11	2SD1819A	TRANSISTOR(SI)	1
		(DIODES)	
D 1	MA4200	DIODE(SI)	1
D 2	PQVDS5688G	DIODE(SI)	1
D 3	PQVDS5688G	DIODE(SI)	1
D 4	PQVDS1YB40F1	DIODE(SI) S	1
D 5	1SS244	DIODE(SI)	1
D 6	1SS119	DIODE(SI) (or 1SS133 or MA165)	1
D 7	MA4082	DIODE(SI)	1
D 8	MA4043	DIODE(SI)	1
D 9	MA4051	DIODE(SI)	1
D11	PQ4R10XJ000	0 (RESISTOR)	1
D12	MA700A	DIODE(SI)	1
D14	PQVDS5688G	DIODE(SI)	1
D15	PQVDS5688G	DIODE(SI)	1
D16	1SS119	DIODE(SI) (or 1SS133 or MA165)	1

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Ref. No.	Part No.	Part Name, Description & Value		Pcs/Set
D17	MA143	DIODE(SI)		1
D19	1S2076	DIODE(SI)		1
		(COILS)		
L2	PQLE109	COIL		1
L5	PQLQXE122J	COIL		1
		(JACKS)		
CN3	PQJJ1TB2S	JACK SOCKET, HANDSET		1
JACK1	PQJJ1T008Z	JACK, TEL		2
JACK2	PQJJ1C001Z	JACK, SOCKET		1
		(OTHERS)		
CN1	PQJS18X54Z	CONNECTOR		1
E1	PQADS3204H	LIQUID CRYSTAL DISPLAY		1
E2	PQJE10090Z	LEAD WIRE		1
E3	PQJM122Z	MICROPHONE		1
E4	PQHR10635Z	LCD HOLDER		1
E5	PQMG10022Z	MIC SPACER		1
POS1	PQRPAR390N	THERMISTOR	S	1
S1	ESE14A211	SWITCH, HOOK		1
X1	PQVBKBR3.58M	CRYSTAL OSCILLATOR		1
ZNR1	PQVDDSS301L	VARISTOR		1
		(RESISTORS)		
R 1	ERDS2TJ561	560		1
R 2	ERDS2TJ561	560		1
R 3	ERDS2TJ334	330K		1
R 4	PQ4R10XJ563	56K	S	1
R 5	PQ4R10XJ272	2.7K	S	1
R 7	PQ4R10XJ331	330	S	1
R 9	PQ4R10XJ562	5.6K	S	1
R10	PQ4R10XJ334	330K	S	1
R11	PQ4R10XJ104	100K	S	1
R12	PQ4R10XJ823	82K	S	1
R13	PQ4R10XJ334	330K	S	1
R14	PQ4R10XJ473	47K	S	1
R15	PQ4R10XJ392	3.9K	S	1
R16	PQ4R10XJ152	1.5K	S	1
R18	ERDS1TJ270	27	S	1
R19	PQ4R10XJ271	270	S	1
R20	PQ4R10XJ222	2.2K	S	1
R21	PQ4R10XJ392	3.9K	S	1
R27	PQ4R10XJ104	100K	S	1
R28	PQ4R10XJ473	47K	S	1
R29	PQ4R10XJ104	100K	S	1

Ref. No.	Part No.	Value		Pcs/Set
R30	PQ4R10XJ104	100K	S	1
R32	PQ4R10XJ270	27	S	1
R39	ERDS2TJ222	2.2K		1
R40	PQ4R10XJ182	1.8K	S	1
R41	PQ4R10XJ222	2.2K	S	1
R42	PQ4R10XJ272	2.7K	S	1
R43	PQ4R10XJ222	2.2K	S	1
R44	PQ4R10XJ182	1.8K	S	1
R47	PQ4R10XJ102	1K	S	1
R48	PQ4R10XJ222	2.2K	S	1
R50	PQ4R10XJ222	2.2K	S	1
R51	PQ4R10XJ102	1K	S	1
R52	PQ4R10XJ103	10K	S	1
R53	PQ4R10XJ103	10K	S	1
R54	PQ4R10XJ105	1M	S	1
R55	PQ4R10XJ105	1M	S	1
R56	PQ4R10XJ000	0		1
R57	PQ4R10XJ000	0		1
R59	PQ4R10XJ224	220K	S	1
R60	PQ4R10XJ102	1K	S	1
R62	PQ4R10XJ473	47K	S	1
R63	PQ4R10XJ564	560K	S	1
R64	PQ4R10XJ473	47K	S	1
R65	PQ4R10XJ563	56K	S	1
R80	ERJ3GEYJ825	8.2M		1
JP37	PQ4R10XJ000	0		1
JP40	PQ4R10XJ000	0		1
JP41	PQ4R10XJ000	0		1
JP46	PQ4R10XJ000	0		1
JP47	PQ4R10XJ000	0		1
		(CAPACITORS)		
C 1	ECQE2155T370	1.5		1
C 2	ECQE2155T370	1.5		1
C 5	PQCUV1H102J	0.001	S	1
C 6	ECKD2H681KB	680P	S	1
C 7	ECKD2H681KB	680P	S	1
C 8	ECQE2223KF	0.022		1
C10	ECEA0JK221	220	S	1
C11	PQCUV1E333MD	0.033	S	1
C12	ECEA1CKS100	10	S	1
C13	PQCUV1H103KB	0.01		1
C14	ECEA0JU471	470		1
C15	ECEA1HKS010	1	S	1
C16	PQCUV1H102J	0.001	S	1
C18	ECEA1CK101	100	S	1
C19	PQCUV1H120JC	12P		1

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Ref. No.	Part No.	Part Name, Description & Value		Pcs/Set
C22	ECEA1CKS100	10	S	1
C24	ECEA0JKS220	22	S	1
C25	PQCUV1H102J	0.001	S	1
C26	PQCUV1H103KB	0.01		1
C27	ECEA1HKS3R3	3.3	S	1
C28	ECEA1HKS2R2	2.2	S	1
C29	ECEA1CK101	100	S	1
C30	PQCUV1H102J	0.001	S	1
C31	PQCUV1H102J	0.001	S	1
C32	PQCUV1E104MD	0.1	S	1
C33	PQCUV1E104MD	0.1	S	1
C34	PQCUV1E683KB	0.068		1
C35	PQCUV1H102J	0.001	S	1
C36	PQCUV1H102J	0.001	S	1
C37	ECEA1CK101	100	S	1
C38	PQCUV1E104MD	0.1	S	1
C39	PQCUV1E104MD	0.1	S	1
C42	ECEA1HKS010	1	S	1
C43	ECEA1HKS010	1	S	1
C44	ECEA1CKS100	10	S	1
C45	PQCUV1H103KB	0.01		1
C46	PQCUV1H223KB	0.022		1
C48	PQCUV1H102J	0.001	S	1
C49	PQCUV1H102J	0.001	S	1
C50	PQCUV1H102J	0.001	S	1
C51	PQCUV1H103KB	0.01		1
C52	PQCUV1H103KB	0.01		1
C53	PQCUV1H560JC	56P		1
C54	PQCUV1H560JC	56P		1
C55	PQCUV1H560JC	56P		1
C56	PQCUV1H560JC	56P		1
C58	ECA0JM222	0.0022		1
C59	PQCUV1C105ZF	1		1
C60	PQCUV1H223KB	0.022		1
C61	PQCUV1H102J	0.001	S	1

OPERATION P.C.BOARD PARTS

PCB2	PQWP2TS17W	OPERATION, P. C. BOARD ASS'Y (NLA)	1
		(ICS)	
IC103	PQVIAS2591	IC	1
		(TRANSISTORS)	
Q101	2SD1819A	TRANSISTOR(SI)	1

Ref. No.	Part No.	Value		Pcs/Set
		(DIODES)		
D109	MA110	DIODE(SI)		1
D110	MA110	DIODE(SI)		1
D111	MA110	DIODE(SI)		1
LED101	PQVDSML210LT	LED		1
		(OTHERS)		
CN101	PQJS36B27Z	CONNECTOR		1
CN102	PQJS18X54Z	CONNECTOR		1
X101	PQVCL3276N9Z	CRYSTAL OSCILLATOR		1
		(RESISTORS)		
R108	PQ4R10XJ334	330K	S	1
R122	PQ4R18XJ102	1K	S	1
R124	PQ4R18XJ473	47K	S	1
R151	PQ4R10XJ000	0		1
R152	PQ4R10XJ000	0		1
R153	PQ4R10XJ000	0		1
R155	PQ4R10XJ153	15K	S	1
R156	PQ4R10XJ104	100K	S	1
J103	PQ4R18XJ000	0	S	1
		(CAPACITORS)		
C108	PQCUV1H103KB	0.01		1

SUB P.C.BOARD PARTS

PCB3	PQWP3TS15W	SUB, P. C. BOARD ASS'Y (NLA)		1
		(TRANSISTORS)		1
Q 1	UN5113	TRANSISTOR(SI)	S	1
Q 2	UN5213	TRANSISTOR(SI)	S	1
Q 3	2SB1218A	TRANSISTOR(SI)		1
		(DIODES)		
D 1	MA110	DIODE(SI)		1
D 2	MA8030	DIODE(SI)		1
		(OTHERS)		
E301	PQHE10108Z	SPONGE		1
		(RESISTORS)		
R 1	ERJ3GEYJ224	220K		1
R 2	ERJ3GEYJ563	56K		1